

**Notice of Allowability**

Application No.

10/771,562

Examiner

Jerry T. Rahl

Applicant(s)

YOKOUCHI ET AL.

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Applicant's Amendment received June 20, 2006.
2. ☒ The allowed claim(s) is/are 3,7-9,11,14,18-20 and 22-28.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

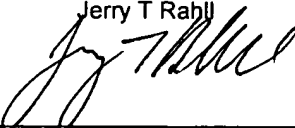
4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

  
John D. Lee  
Primary Examiner

Jerry T Rahl



### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with David E. Heisey on August 29, 2006.

3. The application has been amended as follows.

4. Claim 3 is amended to read:

“An optical switch comprising:

a single optical input for accepting an optical signal;  
an active deflecting element responsive to a control system to deflect said optical signal in a selected one of a plurality of directions, where said deflecting element comprises an electro-optical material and at least first and second pairs of electrodes on opposite sides of said electro-optical material;

a common waveguide to accept an optical signal deflected into any one of said plurality of directions;

a plurality of optical outputs, where each of said plurality of optical outputs corresponds to one of said plurality of directions, and where each of said plurality of optical outputs comprises passive optics to accept said optical signal deflected in one of said plurality of directions and propagated through said common waveguide;

where said deflection of said optical signal to said selected one of said plurality of directions provides switching of said optical signal to a corresponding one of said plurality of optical outputs; and

wherein each electrode of said at least first and second pairs of electrodes is of similar shape, and wherein the optical path of said optical signal passes between each of said electrodes.”

5. Claim 7 is amended to read:

“An optical switch comprising:

a single optical input for accepting an optical signal;

an active deflecting element responsive to a control system to deflect said optical signal in a selected one of a plurality of directions, where said deflecting element comprises an electro-optical material and at least first and second pairs of electrodes on opposite sides of said electro-optical material;

a common waveguide to accept an optical signal deflected into any one of said plurality of directions;

a plurality of optical outputs, where each of said plurality of optical outputs corresponds to one of said plurality of directions, and where each of said plurality of optical outputs comprises passive optics to accept said optical signal deflected in one of said plurality of directions and propagated through said common waveguide;

where said deflection of said optical signal to said selected one of said plurality of directions provides switching of said optical signal to a corresponding one of said plurality of optical outputs; and

wherein said common waveguide has a face having a plurality of facets each adjacent to one of said plurality of optical outputs and perpendicular to said corresponding one of said plurality of directions.”

6. Claim 8 is amended to read:

“An optical switch comprising:

a single optical input for accepting an optical signal;

an active deflecting element responsive to a control system to deflect said optical signal in a selected one of a plurality of directions, where said deflecting element comprises an electro-optical material and at least first and second pairs of electrodes on opposite sides of said electro-optical material;

a common waveguide to accept an optical signal deflected into any one of said plurality of directions;

a plurality of optical outputs, where each of said plurality of optical outputs corresponds to one of said plurality of directions, and where each of said plurality of optical outputs comprises passive optics to accept said optical signal deflected in one of said plurality of directions and propagated through said common waveguide;

where said deflection of said optical signal to said selected one of said plurality of directions provides switching of said optical signal to a corresponding one of said plurality of optical outputs; and

wherein said common waveguide propagates said deflected optical signal in a corresponding one of a plurality of waveguide directions, wherein said common waveguide has a waveguide output adjacent said plurality of optical outputs, and where in said waveguide output is approximately perpendicular to said plurality of waveguide directions,

such that said optical signal is not significantly refracted when exiting said common waveguide.”

7. Claim 9 is amended to read:

“An optical switch comprising:

- a single optical input for accepting an optical signal;
- an active deflecting element responsive to a control system to deflect said optical signal in a selected one of a plurality of directions, where said deflecting element comprises an electro-optical material and at least first and second pairs of electrodes on opposite sides of said electro-optical material;

- a common waveguide to accept an optical signal deflected into any one of said plurality of directions;

- a plurality of optical outputs, where each of said plurality of optical outputs corresponds to one of said plurality of directions, and where each of said plurality of optical outputs comprises passive optics to accept said optical signal deflected in one of said plurality of directions and propagated through said common waveguide;

- where said deflection of said optical signal to said selected one of said plurality of directions provides switching of said optical signal to a corresponding one of said plurality of optical outputs; and

- wherein each of said passive optics includes a lens and an output waveguide, and wherein said passive optics have an optical axis perpendicular to said waveguide output and the input of said output waveguide.”

8. Claim 11 is amended to read:

“An optical switch comprising:

- a single optical input for accepting an optical signal;
- an active deflecting element responsive to a control system to deflect said optical signal in a selected one of a plurality of directions, where said deflecting element comprises an electro-optical material and at least first and second pairs of electrodes on opposite sides of said electro-optical material;

- a common waveguide to accept an optical signal deflected into any one of said plurality of directions;

- a plurality of optical outputs, where each of said plurality of optical outputs corresponds to one of said plurality of directions, and where each of said plurality of optical outputs comprises passive optics to accept said optical signal deflected in one of said plurality of directions and propagated through said common waveguide;

where said deflection of said optical signal to said selected one of said plurality of directions provides switching of said optical signal to a corresponding one of said plurality of optical outputs; and

wherein said optical switch is a hybrid switch and wherein the material through which the optical path of said optical signal through said single optical input, said common waveguide, and said plurality of optical outputs differs from the electro-optical material of said active deflecting element.”

9. Claim 14 is amended to read:

“An optical switch module to switch an optical signal from an input fiber to a selected one of a plurality of output fibers comprising:

a single optical input to accept an optical signal from the input fiber;

optical elements to direct said optical signals to a selected one of a plurality of outputs each optically coupled to one of said plurality of output fibers, where said optical elements comprise:

a collimating element to collimate said optical signal;

an active deflecting element to accept said collimated optical signal and deflect said optical signal in a one of a plurality of directions corresponding to a one of said plurality of outputs, where said deflecting element comprises an electro-optic material and at least first and second pairs of electrodes on opposites sides of said electro-optic material;

a common waveguide having a waveguide input to accept an optical signal deflected by said active deflecting element and a waveguide output, and a focusing element at said plurality of output outputs comprising passive optics focus said optical signal from said common waveguide into said selected one of said plurality of outputs; and

wherein each electrode of said first and second pairs of electrodes is of similar shape and wherein the optical path of said optical signal passes between each of said electrodes.”

10. Claim 18 is amended to read:

“An optical switch module to switch an optical signal from an input fiber to a selected one of a plurality of output fibers comprising:

a single optical input to accept an optical signal from the input fiber;

optical elements to direct said optical signals to a selected one of a plurality of outputs each optically coupled to one of said plurality of output fibers, where said optical elements comprise:

a collimating element to collimate said optical signal;

an active deflecting element to accept said collimated optical signal and deflect said optical signal in a one of a plurality of directions corresponding to a one of said plurality of outputs, where said deflecting element comprises an electro-optic material and at least first and second pairs of electrodes on opposites sides of said electro-optic material;

a common waveguide having a waveguide input to accept an optical signal deflected by said active deflecting element and a waveguide output, and a focusing element at sad plurality of output outputs comprising passive optics focus said optical signal from said common waveguide into said selected one of said plurality of outputs; and

wherein said common waveguide has a face having a plurality of facets each adjacent to one of said plurality of optical outputs and perpendicular to said corresponding one of said plurality of directions.”

11. Claim 19 is amended to read:

“An optical switch module to switch an optical signal from an input fiber to a selected one of a plurality of output fibers comprising:

a single optical input to accept an optical signal from the input fiber;

optical elements to direct said optical signals to a selected one of a plurality of outputs each optically coupled to one of said plurality of output fibers, where said optical elements comprise:

a collimating element to collimate said optical signal;

an active deflecting element to accept said collimated optical signal and deflect said optical signal in a one of a plurality of directions corresponding to a one of said plurality of outputs, where said deflecting element comprises an electro-optic material and at least first and second pairs of electrodes on opposites sides of said electro-optic material;

a common waveguide having a waveguide input to accept an optical signal deflected by said active deflecting element and a waveguide output, and a focusing element at sad plurality of output outputs comprising passive optics focus said optical signal from said common waveguide into said selected one of said plurality of outputs; and

wherein said common waveguide propagates said deflected optical signal in a corresponding one of a plurality of waveguide directions, wherein said common waveguide has a waveguide output adjacent said plurality of optical outputs, and where in said waveguide output is approximately perpendicular to said plurality of waveguide directions, such that said optical signal is not significantly refracted when exiting said common waveguide.”

12. Claim 20 is amended to read:

“An optical switch module to switch an optical signal from an input fiber to a selected one of a plurality of output fibers comprising:  
a single optical input to accept an optical signal from the input fiber;  
optical elements to direct said optical signals to a selected one of a plurality of outputs each optically coupled to one of said plurality of output fibers, where said optical elements comprise:  
a collimating element to collimate said optical signal;  
an active deflecting element to accept said collimated optical signal and deflect said optical signal in a one of a plurality of directions corresponding to a one of said plurality of outputs, where said deflecting element comprises an electro-optic material and at least first and second pairs of electrodes on opposites sides of said electro-optic material;  
a common waveguide having a waveguide input to accept an optical signal deflected by said active deflecting element and a waveguide output, and a focusing element at sad plurality of output outputs comprising passive optics focus said optical signal from said common waveguide into said selected one of said plurality of outputs; and  
wherein each of said passive optics includes a lens and an output waveguide, and wherein said passive optics have an optical axis perpendicular to said waveguide output and the input of said output waveguide.”

13. Claim 22 is amended to read:

“An optical switch module to switch an optical signal from an input fiber to a selected one of a plurality of output fibers comprising:  
a single optical input to accept an optical signal from the input fiber;  
optical elements to direct said optical signals to a selected one of a plurality of outputs each optically coupled to one of said plurality of output fibers, where said optical elements comprise:  
a collimating element to collimate said optical signal;  
an active deflecting element to accept said collimated optical signal and deflect said optical signal in a one of a plurality of directions corresponding to a one of said plurality of outputs, where said deflecting element comprises an electro-optic material and at least first and second pairs of electrodes on opposites sides of said electro-optic material;  
a common waveguide having a waveguide input to accept an optical signal deflected by said active deflecting element and a waveguide output, and a focusing element at sad plurality of output outputs comprising passive optics focus said optical signal from said common waveguide into said selected one of said plurality of outputs; and

wherein said optical switch is a hybrid switch and wherein the material through which the optical path of said optical signal through said single optical input, said common waveguide, and said plurality of optical outputs differs from the electro-optical material of said active deflecting element.”

#### **EXAMINERS STATEMENT OF REASONS FOR ALLOWANCE**

14. The following is an examiner’s statement of reasons for allowance. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

15. Claims 3, 7-9, 11, 14, 18-20, and 22-28 are allowed.

16. US Patent Application Publication No. 2003/0235362 to Sugama et al. describes an optical switch with a single input, an active deflecting element with electrodes and electro-optic material and a plurality of outputs as detailed in the Office Action mailed December 27, 2005.

17. However, Sugama et al. does not describe first and second pairs of electrodes. Sugama et al. only describes three electrodes not arranged into first and second pairs.

18. US Patent Application Publication No. 2003/0235362 to Sugama et al. remains the closest prior art of record in this application. For the reasons stated above, however, Claims 3, 7-9, 11, 14, 18-20, 22, and 23-28 herein are deemed to patentably distinguish over and all other prior art of record.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry T. Rahll whose telephone number is (571) 272-2356. The examiner can normally be reached on M-Th (8:30-5:30).



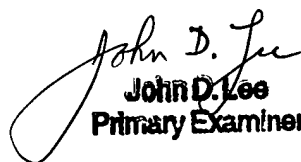
Art Unit: 2874

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Jerry T Rahl



John D. Lee  
Primary Examiner